# United States Patent [19]

**Civitelli**

[11] **4,259,762**

[45] **Apr. 7, 1981**


[54] **SHOCK-ABSORBING HINGE-PIN DOORSTOP**


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[51] **Int. Cl.**[3] ..... **E05D 13/00;** E05D 11/00

[52] **U.S. Cl.** ..... **16/86 B;** 16/137; 16/85

[58] **Field of Search** ..... 16/86 B, 86 R, 86 A, 16/85, 137; 239/18



[56] **References Cited**

U.S. PATENT DOCUMENTS

| | | | |
|---|---|---|---|
| 2,813,293 | 11/1957 | Civitelli | 16/86 B |
| 3,805,322 | 4/1974 | Serrano | 16/86 A |



*Primary Examiner*—Doris L. Troutman



[57] **ABSTRACT**

A hinge-pin doorstop made of spring-steel bent to provide a loop through which the hinge pin on the door hinge fits for mounting purposes, and having a pair of resilient arms which extend radially from the loop in spaced relation to each other, so that when they are pinched between the door and the molding on the door frame, they absorb the shock of the door, thereby preventing damage to the door or frame.


**3 Claims, 5 Drawing Figures**

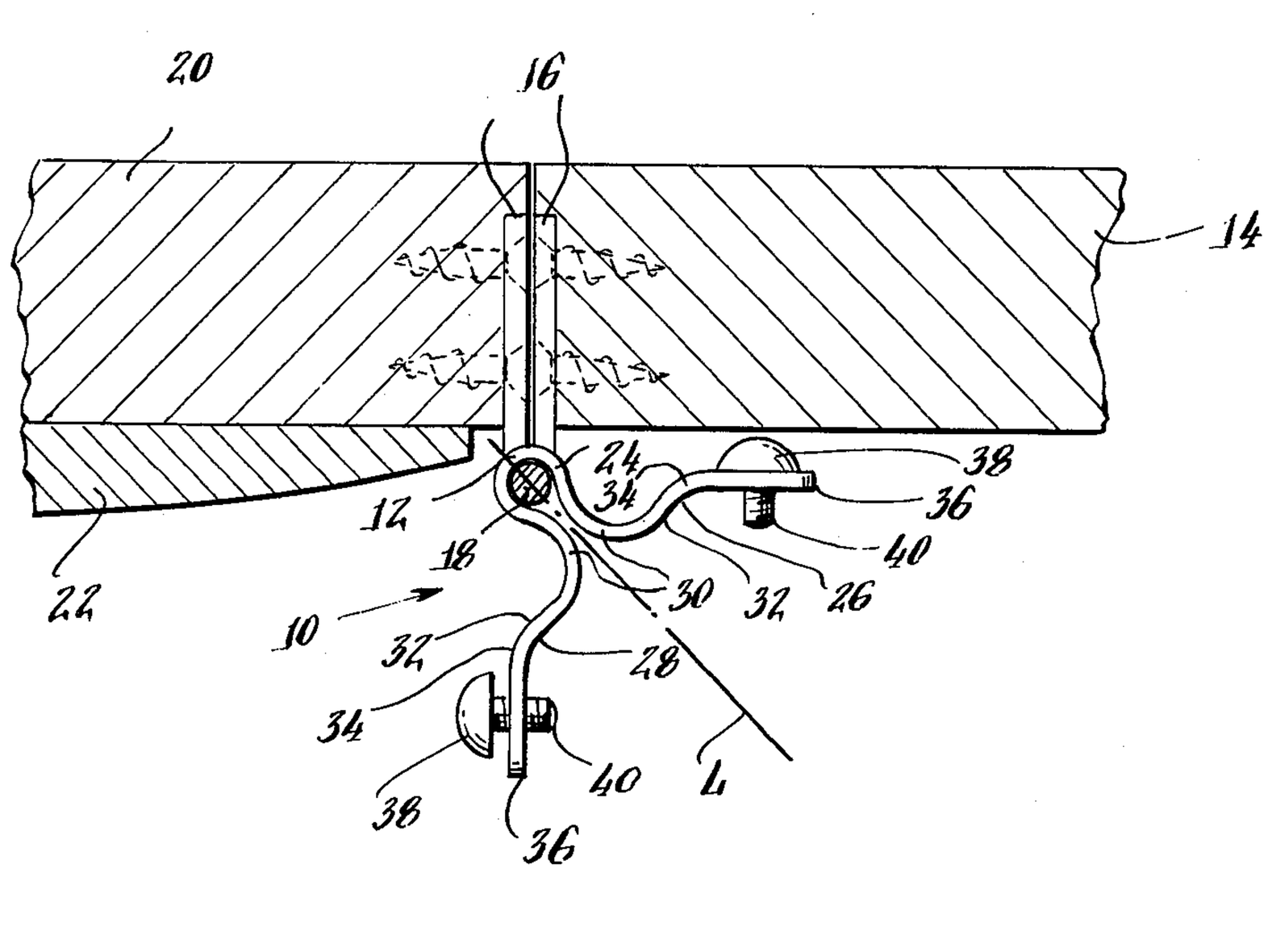


Fig. 1.

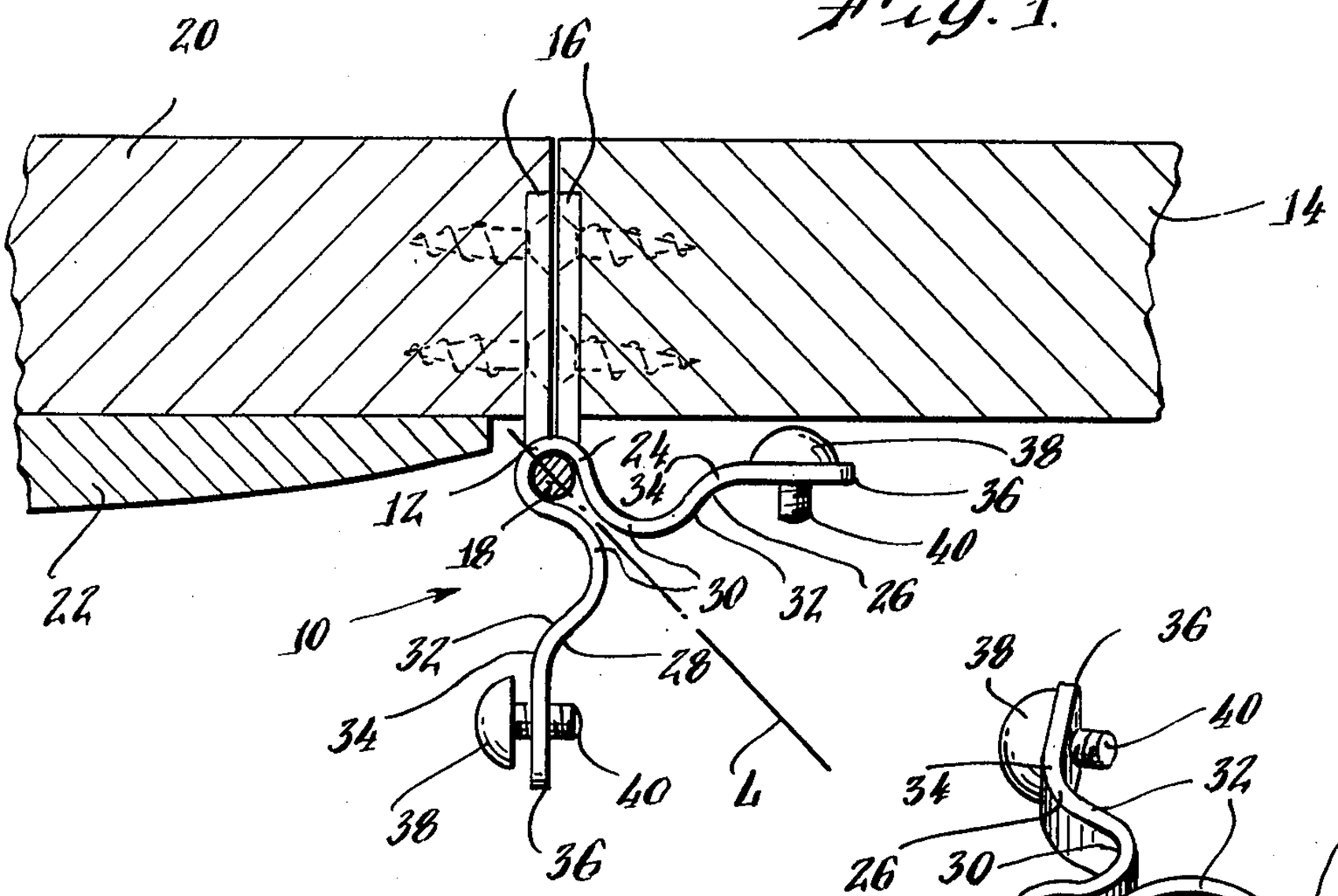



Fig. 2.

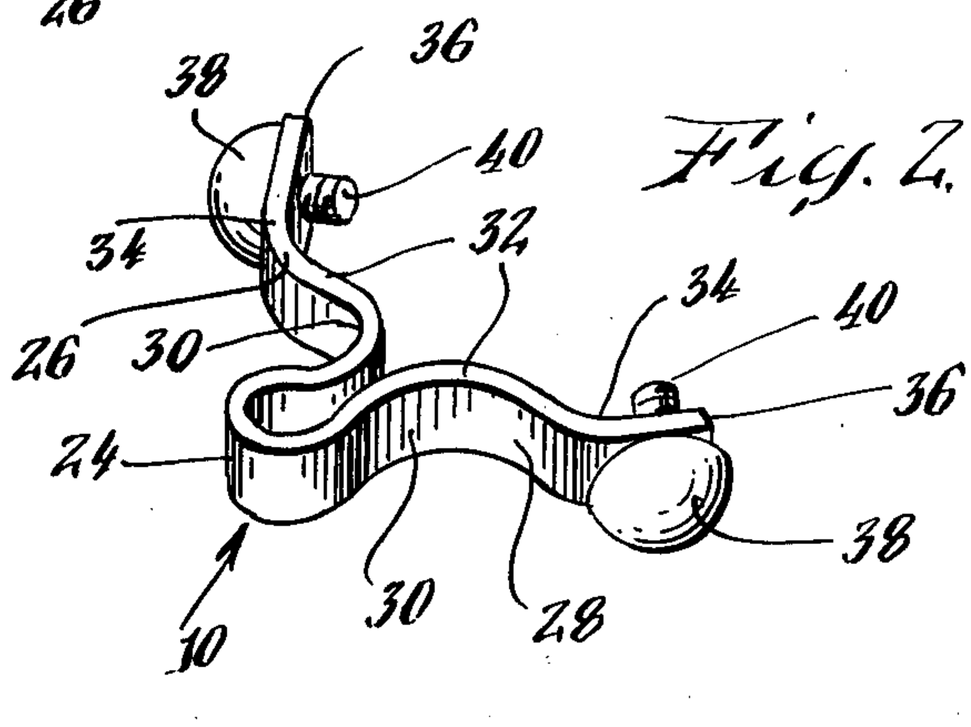
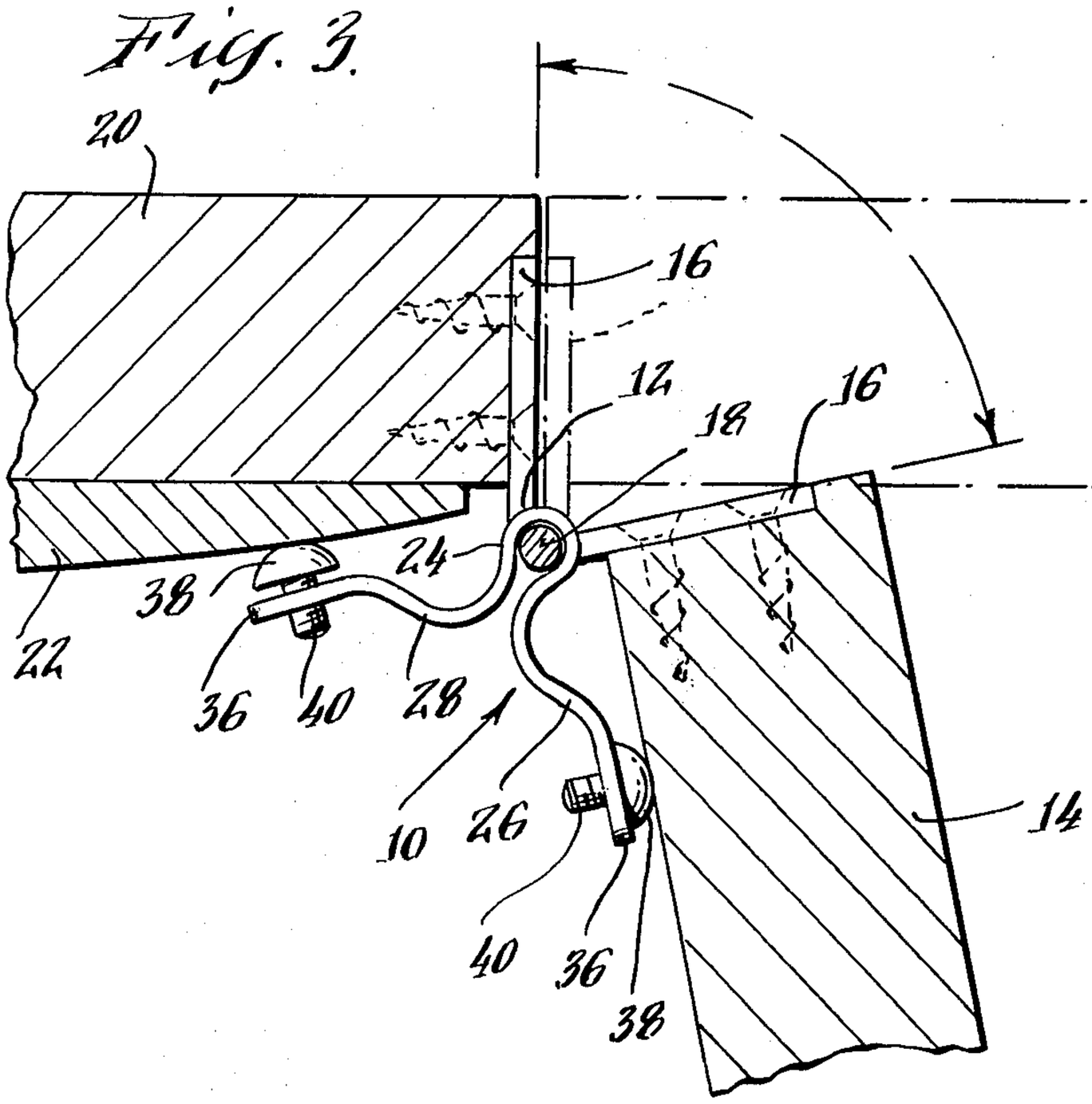



Fig. 3.



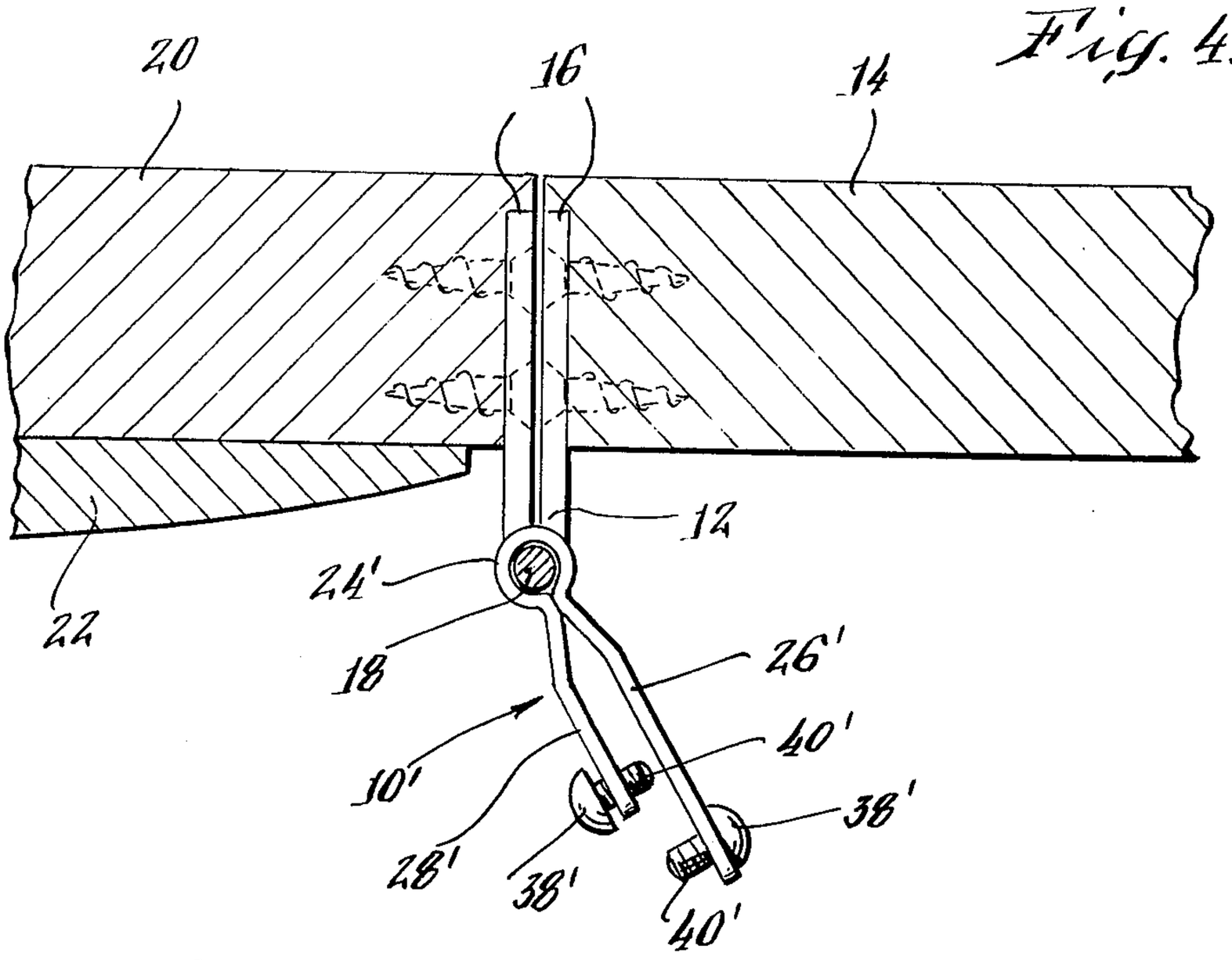

20
16
14
12
24'
22
18
26'
10'
40'
28'
38'
38'
40'

Fig. 4.

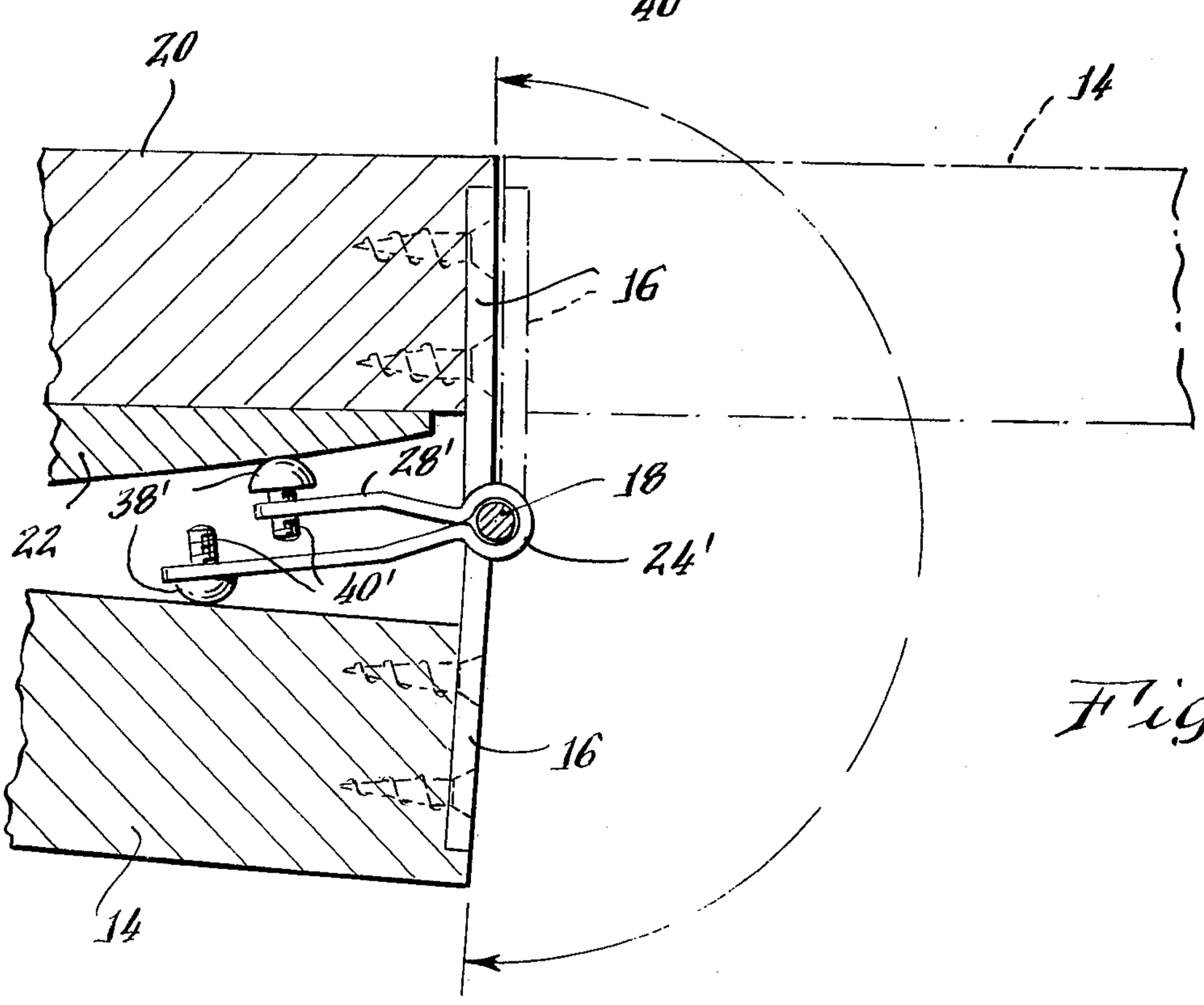

20
14
16
28'
38'
18
22
24'
40'
16
14

Fig. 5.

# SHOCK-ABSORBING HINGE-PIN DOORSTOP

## BACKGROUND OF THE INVENTION

The present invention relates to doorstops and it relates more particularly to the type of doorstop which is mounted on the hinge pin of the door like those shown in my prior U.S. Pat. Nos. 2,683,620 and 2,813,293.

A problem encountered with hinge-pin doorstops is that they tend to damage the door and/or frame at the points where the stop contacts them. This is particularly true where doorstops are used on hollow-core doors due to the fact that the outer panels on such doors are easily penetrated by the bumper on the doorstop under the very high force exerted by the door against the stop at the hinge. To my knowledge there has been no satisfactory prior solution to this problem, despite the fact that it has existed for many years.

An object of the present invention is to provide a hinge-pin doorstop which reduces or eliminates damage to the wood work on the door and frame.

## SUMMARY OF THE INVENTION

The invention resides in forming a hinge-pin doorstop of a continuous length of spring steel having sufficient resilience to absorb the shock of the door when it is swung against the stop. A loop-portion of the stop is provided for mounting it on the hinge pin of the door. Extending from the loop-portion is a first arm-portion with a bumper-member mounted on it in position for engagement with the door. Also extending from the loop-portion is a second arm-portion, which carries another bumper-member disposed in spaced relation to the first for engagement with the door frame, such that when the door is opened the desired amount, the two arm-portions are resiliently squeezed between the door and frame.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The advantages of the invention will be more apparent from the description hereinafter of the preferred embodiments of the invention, reference being had to the accompanying drawings, in which,

FIG. **1** is a cross-sectional view of a portion of a door and door frame, on which my new hinge-pin stop has been mounted, the door being shown closed;

FIG. **2** is a perspective view of the hinge-pin doorstop shown in FIG. **1**;

FIG. **3** is a view similar to FIG. **1**, but showing the door open;

FIG. **4** is a view similar to FIG. **1**, but showing a second embodiment of a hinge-pin doorstop in accordance with the invention; and

FIG. **5** is a view similar to FIG. **4**, but showing the door open.

In the embodiment of the invention shown in FIGS. **1** to **3**, a hinge-pin doorstop **10** is shown mounted on one of the hinges **12** of a door **14**. Hinge **12** is a conventional door hinge having a hinge-plates **16, 16** pivotally connected by a hinge-pin **18**, one of hinge-plates **16, 16** being fastened to the inner edge of the door by suitable wood screws, while the other is similarly fastened to the door frame **20**. The usual molding board **22** is shown on the side of door frame **20**. Doorstop **10** is designed to limit the swing of the door to approximately **90°** of arc.



Doorstop **10** is made of a continuous length of relatively heavy, flat-stock spring-steel formed to provide a loop-portion **24**, from which extend a pair of arms **26** and **28** in a generally radial direction. Loop-portion **24** forms a substantially closed circle, the inside diameter of which is slightly larger than the hinge pin of a standard size door hinge, so that hinge pin **18** can be removed from hinge **12**, inserted through the loop-portion **24** of doorstop **10** and then replaced on the hinge with the doorstop attached thereto. Loop-portion **24** surrounds more than half the hinge pin **18** in order to ensure that the doorstop **10** can not come loose therefrom.

In this instance, both arms **26** and **28** are of identical shape and length, each having a circular bend **30**, having a curvature which is the reverse of the loop-portion **24**, and tangent thereto. Bend **30** on each arm **26, 28** extends through approximately 100° of arc, the radius of which is about twice that of loop-portion **24**. A short straight section **32** extends from each bend **30** such that both sections **32, 32** extend outward in exactly opposite directions on a line that is perpendicular to the centerline L of the stop **10**. Each section **32** terminates in a 45° bend **34** that joins it with a straight end portion **36** disposed radially of hinge pin **18** and in this instance at right angles to the end portion on the other arm. A bumper **38**, is adjustably mounted on each end portion **36** so that they face outwardly of each other, each bumper **38** being made of a suitable rubber or plastic material and having an integral mounting post **40**, which is threaded into a tapped hole in each of the end portions **36, 36**.

When the door **14** is swung open as illustrated in FIG. **3** it engages the bumper on arm **26** of the doorstop **10**, pivoting it until the bumper on the other arm **28** engages the molding board **22**, thereby preventing the door from opening further, such action being similar to that of conventional hinge-pin doorstops which are rigid. However, if the foor is swung open rapidly or with considerable force, the arms **26, 28** of my stop yield by resiliently bending toward each other under the force exerted against them by the door, thereby absorbing much of the tremendous force generated near the hinge pin. Consequently, the bumpers **38, 38** are not driven against the side of the door **14** and the molding board **22** with the impact they receive from rigid stops employed heretofore, and therefore they do not permanently damage the surfaces of these members or leave unslightly marks on them.

A limited amount of adjustment for the place at which the door is stopped is provided by the threaded posts **40, 40** on which bumpers **38, 38** are mounted. For example, by unscrewing one or both of the bumpers **38**, they will extend a short distance from the end portions **36, 36** on the respective arms **26** and **28**, increasing the distance between them and reducing the arc through which the door can swing before both bumpers engage. By rotating both bumpers in the opposite direction until they seat against the ends of arms **26, 28**, the door is permitted to swing farther. It is important that at least the end-portions **36, 36** of the arms **26, 28** extend in directions which are radial to the hinge-pin **18** so that the threaded mounting posts **40, 40** on bumpers **38, 38** extend perpendicular to the surfaces they engage.

It will be apparent that where it is desired to let the door swing back 180° against the wall, the resilient arms of a hinge pin doorstop embodying my invention can be formed so that they extend substantially straight out from the hinge pin as illustrated in FIGS. **4** and **5**. Thus,

the doorstop **10'** like the one shown in FIGS. **1–3** is made of a continuous length of heavy spring-steel with a loop-portion **24'**, through which the hinge pin **18** fits, and a pair of arms **26'** and **28'** extending radially from loop-portion **24'**. In this instance arms **26'**, **28'** are both straight throughout most of their length with bumpers **38'**, **38'** at the outer ends for engagement with the door **14** and frame **20**, respectively. In order to avoid interference between the mounting posts **40'**, **40'**, arm **28'** should be somewhat shorter than arm **26'**. However, arms **26'** and **28'** may be of equal length if adjustment of bumpers **38'**, **38'** is not required. In that event mounting posts **40'**, **40'** can be shortened or replaced with mounting studs (not shown) which do not project beyond the rear surface of each arm **26'** or **28'**.

As will be seen in FIG. **5** the doorstop **10'** permits door **14** to swing back through an arc approaching 180° before both bumpers **38'**, **38'** engage the molding **22** on door frame **20**, at which point arms **26'** and **28'** are flexed slightly under the force of door **14**, thereby absorbing the impact and preventing damage to the door or molding.

I claim:

**1**. A hinge-pin doorstop formed from a continuous length of steel and having

a loop-position adapted to encircle the hinge pin,

a first arm-portion extending generally radially from said loop-position,

a bumper-member mounted on said first-arm portion in position for engagement with the door,

a second arm-portion extending generally radially from said loop-portion into spaced relationship with respect to said first arm-portion,

a second bumper-member mounted on said second arm-portion in position for engagement with the door frame,

said arm-portions being disposed such that when the door is swung open the desired amount said arm-portions are squeezed between the door and frame resiliently stopping the door from opening farther, the resilience of said arm-portions being sufficient to absorb enough of the force exerted by the door against them to prevent damage to the surfaces of the door and frame at the points engaged by said bumper-members.

**2**. A hinge-pin doorstop as defined in claim **1**, wherein each of said bumper-members is separably mounted on its arm-portion for relative displacement arcuately about said loop-portion in order to adjust the amount by which the door may open.

**3**. A hinge-pin doorstop as defined in claim **2**, wherein each of said bumper-members is mounted on one end of an elongated screw threaded to the corresponding one of said arm-portions with its longitudinal axis extending tangentially of said hinge pin.

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